

REMARKS

The subject matter of the present application is directed to an injection moulded product which has a “smart card blank” embedded in it, or a smart card blank is attached to the injection moulded layer or product. The smart card blank is attached to the injection moulded product via a thermoplastic resin which is sometimes referred to as an “intermediate layer” in the application. The intermediate layer(s) is attached to the substrate to form a smart card blank, the blank with the intermediate layer is placed into an injection mould, and a molten thermoplastic is injected into the mould. The intermediate layer(s) melt from being exposed to the hot injected thermoplastic. The intermediate layer(s) form a bond between the injection moulded product and the smart card blank.

The intermediate layer can be an extruded thermoplastic film or a thermoplastic adhesive bonding film. These thermoplastic resins forming the “intermediate layer” provide benefits beyond just a firm bond. Without the thermoplastic resin, the blank can wrinkle (possibly adversely affecting the antenna and the integrated circuit) and not form a bond with the injection moulded material. With the thermoplastic material, the carrier web layer or smart card blank remains straight inside or on the surface of the injection moulded product. Moreover, when a thermoplastic film is used as the intermediate layer, a “smart card blank” can be fabricated, such as by extruding a thermoplastic film onto a substrate web with an integrated circuit and circuitry pattern. The latter fabrication then can be placed into an injection mould to bond and/or embed the smart card blank into the injection moulded layer or body.

The Claims And The Rejections

Method claims 6-9 have been cancelled as non-elected claims in view of the examiner’s November 2004 restriction requirement. In this amendment, these claims have been cancelled without prejudice to pursuing them in a continuation application. With this amendment:

- (1) claims 1-5 which are directed to an injection moulded product have been amended;
- (2) method claims 6-9 have been cancelled;
- (3) claims 10 and 11 have been amended and now are directed to a smart card (as opposed to a smart card blank);
- (4) claim 12 has been cancelled; and
- (5) claims 13-29 have been added.

Claims 1 (an injection molded product with a melted intermediate layer), 10 (a smart card with a melted intermediate layer), 19 (an injection moulded radio frequency identification circuit product having an intermediate layer selected from the groups consisting of a melted thermoplastic extruded layer or a melted thermoplastic adhesive bonding film), 23 (a smart card having an extruded thermoplastic film melted during injection moulding of an injection moulded layer), 25 (an injection moulded product having a melted thermoplastic adhesive bonding film melted during the injection moulding of an injection moulded layer) and 28 (an injection moulded product with a carrier web layer selected form the group consisting of polyester and biaxially oriented polypropylene, and a melted thermoplastic adhesive bonding film selected from the group consisting of poyolefin, polyurethane and polyester) are the remaining independent claims. All are product claims.

The examiner rejected claim 1 as anticipated by USPN 5,026,452 to Kodai or USPN 5,250,341 to Kobayaski et al. The examiner rejected claims 1-5 and 10-12 as anticipated by USPN 5,590,773 to Fidalgo.

Kodai

Kodai describes a method of producing IC cards. No injection moulding is described. Rather, an adhesive sheet 6 is placed beneath a cavity which receives and IC module. When the multilayered card is heated and pressed, the adhesive melts, fills free space in the cavity and forms an integral structure.

Kodai does not describe a contactless card (see col. 3, lines 56-57 which refers to external connection terminals of the IC module 2) so Kodai does not have a circuitry pattern to consider or damage when making his card.

Kobayashi

Kobayashi describes a method of producing IC cards. No injection moulding is described. Moreover, Kobayashi does not describe a contactless card (see col. 3, line 40 which refers to external connection terminal 4) so Kobayashi does not have a circuitry pattern to consider or damage when making his card.

Kobayashi describes applying an adhesive between core layers in the area of an opening in which an IC module is placed. The multilayers are heated with heat and pressure where the adhesive melts, fills a gap in the opening for the IC module and the IC card is produced.

Fidalgo

Fidalgo describes making a card. A frame is deposited on a lower thermoplastic sheet 2. The frame demarcates the edges of a cavity. An electronic module is placed in the cavity on sheet 2 and the cavity is filled with resin 8. An upper thermoplastic sheet 10 is placed on the polymerizable resin. Fidalgo does not describe the use of the thermoplastic resin between a carrier web and an injection molded product which bonds the injection molded product to a carrier web. Indeed, Fidalgo's "intermediate resin" is the resin 8. That resin is a thermosetting resin, not a thermoplastic resin. See column 4, line 44 of Figalgo. Fidalgo is the opposite of applicant's invention. If the examiner considers resin 8 an injection moulded resin, then that thermosetting resin (not thermoplastic) is an "intermediate layer" that is used to keep two thermoplastic sheets (2 and 10) together. In Fidalgo a thermoplastic sheet does not bond a substrate sheet to an injection moulded layer. Moreover, Fidalgo does not identify his thermoplastic sheets as adhesives, indeed Fidalgo has to use a "drop of bonder" to stabilize electronic module 4 on sheet 2, see column 4, lines 5-6.

The Claims Are Not Anticipated Or Obvious In View Of The References Alone Or In Combination.

The references cited and applied by the examiner do not address the problem solved by the applicant, nor do they suggest the solution of the problem.

Applicant has a structure that avoids wrinkling a substrate base with a circuitry pattern and an integrated circuit. The application of the thermoplastic protects the circuitry pattern, circuit and chip. Moreover as noted at page 3, lines 5-11 of the specification, the thermoplastic intermediate layer and the injection moulding layer protect the circuitry patter and the chip, the uneven surface of the smart card blank can be flattened out by the injection moulding layer, and the manufacturing costs are low. The material basis of the smart card blank is not restricted by heat sealing properties which is the case when a rigid card is formed by lamination of layers.

Kodai and Kobayashi do not involve injection moulding and are directed to the lamination of layers to make a card. They are not relevant to the invention.

Fidalgo is not combinable with Kodai and Kobayashi. Kodai and Kobayashi involve the lamination of multiple film layers while Fidalgo uses a molten thermosetting resin as an intermediate resin. Fidalgo does not involve the lamination of multiple film layers, but rather has an upper and lower film being applied to a molten resin.

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None of the references which have been cited and applied suggest a thermoplastic film which has been melted to bond a substrate with an antenna and circuit to an injection moulded layer. This is especially the case where the heat of the injection moulding melts the thermoplastic adhesive.

The Recently Cited Asplund and Smulson References

Copending with this application is Serial No. 10/310,699. The examiner in the latter application cited and applied U.S. Patent No. 6,248,199 to Smulson and U.S. Patent No. 6,293,470 to Asplund, which are cited in the Information Disclosure Statement filed with this amendment. While those references describe the manufacture of layered smart cards, neither reference describes using a layered smart card blank and bonding it with an injection moulded product.

Conclusion

In view of the foregoing, applicant respectfully request reconsideration and allowance of the pending claims.

Respectfully submitted,

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